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# New Product: Catalyst 3550 Series Intelligent Ethernet Switches

## Product Overview

The Cisco Catalyst 3550 Series Intelligent Ethernet Switches is a new line of enterprise-class, stackable, multilayer switches that provide high availability, scalability, security and control to enhance the operation of the network. With a range of Fast Ethernet and Gigabit Ethernet configurations, the Catalyst 3550 Series can serve as both a powerful access layer switch for medium enterprise wiring closets and as a backbone switch for mid-sized networks. For the first time, customers can deploy network-wide intelligent services, such as advanced quality of service (QoS), rate-limiting, Cisco security access control lists, multicast management, and high-performance IP routing-while maintaining the simplicity of traditional LAN switching. Embedded in the Catalyst 3550 Series is the Cisco Cluster Management Suite (CMS) Software, which allows users to simultaneously configure and troubleshoot multiple Catalyst desktop switches using a standard Web browser. Cisco CMS Software provides new configuration wizards that greatly simplify the implementation of converged applications and network-wide services.

The Cisco Catalyst 3550 Series Intelligent Ethernet Switches are available in the following configurations:

- Catalyst 3550-24 Switch-24 10/100 ports and two Gigabit Interface Converter (GBIC)-based Gigabit Ethernet ports; 1 rack unit (RU)
- Catalyst 3550-48 Switch-48 10/100 ports and two GBIC-based Gigabit Ethernet ports; 1 RU
- Catalyst 3550-12G Switch-10 GBIC-based Gigabit Ethernet ports and two 10/100/1000BaseT ports; 1.5 RU
- Catalyst 3550-12T Switch-10 10/100/1000BaseT ports and two GBIC-based Gigabit Ethernet ports; 1.5 RU

The built-in Gigabit Ethernet ports in these switches accommodate a range of GBIC transceivers, including the Cisco GigaStack GBIC, 1000BaseT, 1000BaseSX, 1000BaseLX/LH, and 1000BaseZX GBICs. The dual GBIC-based Gigabit Ethernet implementation on the Fast Ethernet configurations provides customers tremendous deployment flexibility, allowing customers to implement one type of stacking and uplink configuration today, while preserving the option to migrate that configuration in the future. High levels of stack resiliency can also be implemented by deploying dual redundant Gigabit Ethernet uplinks, a redundant GigaStack GBIC loopback cable, UplinkFast and CrossStack UplinkFast technologies for high-speed uplink and stack interconnection failover, and Per VLAN Spanning Tree Plus (PVST+) for uplink load balancing. This Gigabit Ethernet flexibility makes the Catalyst 3550 switches an ideal LAN edge complement to the Cisco Catalyst 6500 Family of Gigabit Ethernet optimized core LAN switches.

Included with the Catalyst 3550-24 and 3550-48 are the Standard Multilayer Software Image (SMI) or the Enhanced Multilayer Software Image (EMI). The EMI provides a richer set of enterprise-class features including hardware-based IP unicast and multicast routing, inter-virtual LAN (VLAN) routing, routed access control lists (ACLs), and the Hot Standby Router Protocol (HSRP). After initial deployment, the Enhanced Multilayer Software Image Upgrade Kit gives users the flexibility to upgrade to the EMI. The Catalyst 3550-12T and 3550-12G are only available with the Enhanced Multilayer Software Image.

## Key Features and Benefits

### Availability

#### Superior Redundancy for Fault Backup

- Cisco UplinkFast/BackboneFast technologies ensure quick fail-over recovery enhancing overall network stability and reliability.
- CrossStack UplinkFast (CSUF) technology provides increased redundancy and network resiliency through fast spanning-tree convergence (less than two seconds) across a stack of switches using GigaStack™ GBICs in an independent stack backplane cascaded configuration.
- Supports Cisco Hot Standby Router Protocol (HSRP) to create redundant failsafe routing topologies-requires Enhanced Multilayer Software Image (EMI).

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- Redundant stacking connections provide support for a redundant loopback connection for top and bottom switches in an independent stack backplane cascaded configuration.
  - Command switch redundancy enabled in the Cisco Cluster Management Suite (CMS) Software allows customers to designate a backup command switch that takes over cluster management functions if the primary command switch fails.
  - Provides unidirectional link detection (UDLD) for detecting and disabling unidirectional links on fiber-optic interfaces caused by incorrect fiber-optic wiring or port faults.
  - Support for Cisco's optional Redundant Power System 300 (RPS 300) that provides superior internal power source redundancy for up to six Cisco networking devices resulting in improved fault tolerance and network uptime.

### Integrated Cisco IOS Features for Bandwidth Optimization

- Bandwidth aggregation of up to 16 Gbps through Gigabit EtherChannel® technology and up to 1.6 Gbps through Fast EtherChannel technology enhances fault tolerance and offers higher speed aggregated bandwidth between switches, to routers and individual servers.
- Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance.
- IEEE 802.1D Spanning-Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance.
- Per VLAN Spanning Tree Plus (PVST+) allows for Layer 2 load sharing on redundant links to efficiently utilize the extra capacity inherent in a redundant design.
- Equal cost routing for Layer 3 load balancing and redundancy -requires Enhanced Multilayer Software Image (EMI).
- Local Proxy ARP works in conjunction with private VLAN edge to minimize broadcasts and maximize available bandwidth.
- VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices.
- Internet Group Management Protocol (IGMP) snooping provides for fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors.
- Multicast VLAN registration (MVR) continuously sends multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs for bandwidth and security reasons.

## Security

### Network-Wide Security Features

- IEEE 802.1x (planned future software support) for dynamic port-based security.
- Cisco security VLAN ACLs (VACLs) on all VLANs to prevent unauthorized data flows to be bridged within VLANs.
- Cisco standard and extended IP security Router ACLs (RACLs) for defining security policies on routed interfaces for control plane and data plane traffic-requires Enhanced Multilayer Software Image (EMI).
- Time-based ACLs allow the implementation of security settings during specific periods of the day.
- Private VLAN edge provides security and isolation between ports on a switch, ensuring that voice traffic travels directly from its entry point to the aggregation device through a virtual path and cannot be directed to a different port.
- TACACS+ and RADIUS (planned future software support) authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.
- MAC-based port-level security prevents unauthorized stations from accessing the switch (planned future software support).
- Multilevel security on console access prevents unauthorized users from altering the switch configuration.
- The user-selectable address-learning mode simplifies configuration and enhances security.

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- Bridge protocol data unit (BPDU) guard shuts down Spanning-Tree Protocol PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops.
  - Spanning-tree root guard (STRG) prevents edge devices not in the network administrator's control from becoming Spanning-Tree Protocol root nodes.

## Control

### Advanced Quality of Service

- 802.1p class of service (CoS) and Differentiated Services Code Point field (DSCP) classification via marking and reclassification on a per packet basis using source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP port number.
- Cisco control plane and data plane quality of service ACLs on all ports to ensure proper marking on a per packet basis.
- Four egress queues per port supported in hardware to enable differentiated management of up to four types of traffic.
- Weighted Round Robin (WRR) scheduling to ensure differential prioritization of packet flows by intelligently servicing the egress queues.
- Weighted Random Early Detection (WRED) on all Gigabit Ethernet ports for avoidance of congestion at the egress queues before a disruption occurs.
- Strict priority queuing to guarantee that the highest priority packets will always get serviced ahead of all other traffic.
- No performance penalty for highly granular quality of service functionality.

### Granular Rate-Limiting

- Cisco Committed Information Rate (CIR) functionality allows bandwidth to be guaranteed in increments as low as 8 Kbps.
- Rate-limiting based on source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP information-or any combination of these fields-using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps.
- Ability to easily manage data flows asynchronously upstream and downstream from the end station or on the uplink via ingress and ingress policing.
- 8 aggregate or individual ingress policers and 8 aggregate egress policers on each 10/100 port.
- 128 aggregate or individual ingress policers and 8 aggregate egress policers on each Gigabit Ethernet port.

### Superior Manageability

- Built-in Web-based Cisco Cluster Management Suite (CMS) Software provides an easy-to-use Web-based management interface through a standard web browser.
- Simple Network Management Protocol (SNMP) v1 and v2c, and Telnet interface support delivers comprehensive in-band management, and a command-line interface (CLI)-based management console provides detailed out-of-band management.
- Manageable through CiscoWorks™ network management software on a per-port and per-switch basis providing a common management interface for Cisco routers, switches and hubs.
- Cisco IOS CLI support provides common user interface and command set with all Cisco routers and Cisco desktop switches.
- Supported by the Cisco Quality Policy Manager (QPM) solution for end-to-end QoS policies (planned future software support).
- Supported by the CiscoWorks 2000 LAN Management Solution.
- Supported by the Service Assurance (SA) Agent to facilitate service level management throughout the LAN.

- Switch Database Manager templates for access, routing, and VLAN deployment scenarios allow the network administrator to easily maximize memory allocation to the desired features based on deployment-specific requirements.
- VLAN trunks can be created from any port using either standards-based 802.1Q tagging or the Cisco ISL VLAN architecture.
- Support for up to 1,005 VLANs per switch and up to 128 instances of spanning tree per switch.
- Cisco Group Management Protocol (CGMP) server functionality enables a switch to serve as the CGMP router for CGMP client switches-requires Enhanced Multilayer Software Image (EMI).
- IGMP snooping provides for fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors.
- Embedded Remote Monitoring (RMON) software agent supports four RMON groups (History, Statistics, Alarms and Events) for enhanced traffic management, monitoring, and analysis.
- Support for all nine RMON groups through use of a Switch Port Analyzer (SPAN) port, which permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe.
- Domain Name Services (DNS) provide IP address resolution with user-defined device names.
- Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location.
- Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all switches within the intranet.
- Multifunction LEDs per port for port status, half-duplex/full-duplex, 10BaseT/100BaseTX /1000BaseT indication, as well as switch-level status LEDs for system, redundant power supply, and bandwidth utilization provide a comprehensive and convenient visual management system.

## High-Performance IP Routing

All IP routing features require the Enhanced Multilayer Software Image (EMI)

- Cisco Express Forwarding (CEF)-based routing architecture performed in hardware to deliver extremely high-performance IP routing.
- Support for all commonly deployed and industry standard IP unicast routing protocols (RIPv1, RIPv2, OSPF, IGRP, EIGRP) for load balancing and constructing scalable LANs.
- Static IP routing for manually building a routing table of network path information.
- Inter-VLAN IP routing for full Layer 3 routing between two or more VLANs.
- Equal cost routing for load balancing and redundancy.
- Protocol-Independent Multicast (PIM) for IP multicast routing within a network that enables the network to receive the multicast feed requested and for switches not participating in the multicast to be pruned - support for PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode.
- Distance Vector Multicast Routing Protocol (DVMRP) tunneling for interconnecting two multicast-enabled networks across non-multicast networks.
- Fallback bridging for forwarding of non-IP traffic between two or more VLANs.
- Cisco Hot Standby Router Protocol (HSRP) to create redundant fail-safe routing topologies.

## Scalability

### Ultra-Flexible and Scalable Stacking and Cisco Switch Clustering Technology

- The Cisco GigaStack Gigabit Interface Converter (GBIC) delivers a hardware-based, independent stacking bus with up to 2 Gbps forwarding rate in a point-to-point configuration, or 1-Gbps forwarding bandwidth when daisy chained with up to nine switches.

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- Cisco Cluster Management Suite (CMS) Software allows the user to manage up to 16 inter-connected Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, and 1900 switches through a single IP address, without the limitation of being physically located in the same wiring closet.
  - Full backward compatibility of the Cisco CMS Software ensures that any Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, or 1900 Switch can be managed with a Cisco Catalyst 3550 Switch.
  - The cluster software upgrade feature allows the user to automatically upgrade the system software on a group of Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, and 1900 switches.
  - Cisco Cluster Management Suite Software has been extended to include multilayer feature configurations such as Routing Protocols, ACLs, and QoS parameters.
  - Clustering now supports member discovery and cluster creation across a single Catalyst 3550 routed hop, enabling the entire LAN to be managed in a single web interface (and with a single IP address if desired).
  - Cisco Cluster Management Suite Configuration Wizards use just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, or high-priority data. In addition, a wizard for security is provided to restrict unauthorized access to servers with sensitive data. (Voice, data, and security wizards will be available in a future software release.)
  - Cisco Cluster Management Suite Guide Mode assists users in the configuration of powerful advanced features by providing step-by-step instructions.
  - Cisco Cluster Management Suite provides enhanced on-line help for context-sensitive assistance.
  - Easy-to-use graphical interface provides both a topology map and front panel view of the cluster.

## Ease of Use and Ease of Deployment

- Auto-configuration eases deployment of switches in the network by automatically configuring multiple switches across a network via a boot server.
- Auto-sensing on each non-GBIC port detects the speed of the attached device and automatically configures the port for 10-, 100-, or 1000-Mbps operation, easing the deployment of the switch in mixed 10, 100, and 1000BaseT environments.
- Auto-negotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth.
- Cisco Discovery Protocol (CDP) Versions 1 and 2 enable a CiscoWorks network management station to automatically discover the switch in a network topology.
- Cisco VLAN Trunking Protocol (VTP) supports dynamic VLANs and dynamic trunk configuration across all switches.
- Support for dynamic VLAN assignment through implementation of VLAN Membership Policy Server (VMPS) client functionality provides flexibility in assigning ports to VLANs.
- Dynamic Trunking Protocol (DTP) enables dynamic trunk configuration across all ports in the switch.
- Port Aggregation Protocol (PAgP) automates the creation of Cisco Fast EtherChannel® or Gigabit EtherChannel groups, enabling linking to another switch, router, or server.
- Dynamic Host Configuration Protocol (DHCP) relay allows a broadcast DHCP request to be forwarded to the network DHCP server—requires Enhanced Multilayer Software Image (EMI).
- IEEE 802.3z-compliant 1000BaseSX, 1000BaseLX/LH, 1000BaseZX, and 1000BaseT physical interface support through a field-replaceable GBIC module provides customers unprecedented flexibility in switch deployment.
- The default configuration stored in Flash ensures that the switch can be quickly connected to the network and can pass traffic with minimal user intervention.

# Specifications

## Hardware

**Table 21-113: Technical Specifications for the Catalyst 3550 Series Intelligent Ethernet Switches**

Description	Specification
Performance	<p>24 Gbps switching fabric (Catalyst 3550-12G and Catalyst 3550-12T), 13.6 Gbps switching fabric (Catalyst 3550-48), 8.8 Gbps switching fabric (Catalyst 3550-24)</p> <p>12 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-12G and Catalyst 3550-12T), 6.8 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-48), 4.4 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-24)</p> <p>17.0 Mpps forwarding rate for 64-byte packets (Catalyst 3550-12G and 3550-12T), 10.1 Mpps forwarding rate for 64-byte packets (Catalyst 3550-48), 6.6 Mpps forwarding rate for 64-byte packets (Catalyst 3550-24)</p> <p>4 MB memory architecture shared by all ports (Catalyst 3550-12G, 3550-12T, and 3550-48), 2 MB memory architecture shared by all ports (Catalyst 3550-24)</p> <p>32 MB DRAM and 8 MB Flash memory</p> <p>Configurable up to 12,000 MAC addresses (Catalyst 3550-12G and 3550-12T), Configurable up to 8,000 MAC addresses (Catalyst 3550-48 and 3550-24)</p> <p>Configurable up to 24,000 unicast routes (Catalyst 3550-12G and 3550-12T), Configurable up to 16,000 unicast routes (Catalyst 3550-48 and 3550-24)</p> <p>Configurable up to 8,000 multicast routes (Catalyst 3550-12G and 3550-12T), Configurable up to 2,000 multicast routes (Catalyst 3550-48 and 3550-24)</p> <p>Configurable Maximum Transmission Unit (MTU) of up to 2,025 Bytes for bridging of MPLS tagged frames (Catalyst 3550-12G and 3550-12T), Configurable Maximum Transmission Unit (MTU) of up to 1,546 Bytes for bridging of MPLS tagged frames (Catalyst 3550-48 and 3550-24)</p>
Connectors and Cabling	<p>10BaseT ports: RJ-45 connectors; two-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling</p> <p>100BaseTX ports: RJ-45 connectors; two-pair Category 5 UTP cabling</p> <p>1000BaseT ports: RJ-45 connectors; two-pair Category 5 UTP cabling</p> <p>1000BaseT GBIC-based ports: RJ-45 connectors; two-pair Category 5 UTP cabling1000BaseSX, -LX/LH, -ZX GBIC-based ports: SC fiber connectors, single-mode or multimode fiber</p> <p>GigaStack GBIC ports: copper-based Cisco GigaStack cabling</p> <p>Management console port: 8-pin RJ-45 connector, RJ-45-to-RJ-45 rollover cable with RJ-45-to-DB9 adaptor for PC connections. For terminal connections, use RJ-45-to-DB25 female DTE adapter (can be ordered separately from Cisco, part number ACS-DSBUASYN=)</p>
Power Connectors	<p>Customers can provide power to a switch by using either the internal power supply or the Cisco Redundant Power System (RPS) 300. The connectors are located at the back of the switch.</p> <p><b>Internal Power Supply Connector</b></p> <p>The internal power supply is an auto-ranging unit.</p> <p>The internal power supply supports input voltages between 100 and 240 VAC.</p> <p>Use the supplied AC power cord to connect the AC power connector to an AC power outlet.</p> <p><b>Cisco RPS Connector</b></p> <p>The connector offers connection for an optional Cisco RPS 300 that uses AC input and supplies DC output to the switch.</p> <p>The connector offers a 300-watt redundant power system that can support six external network devices and provides power to one failed device at a time.</p> <p>The connector automatically senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic.</p> <p>When the internal power supply has been brought up or replaced, the Cisco RPS 300 automatically stops powering the device.</p> <p>Attach only the Cisco RPS 300 (model PWR300-AC-RPS-N1) to the redundant-power-supply receptacle.</p>
Mean Time Between Failure (MTBF)	<p>110,332 hours (Catalyst 3550-12G)</p> <p>113,658 hours (Catalyst 3550-12T)</p> <p>193,000 hours (Catalyst 3550-24)</p> <p>163,000 hours (Catalyst 3550-48)</p>

**Table 21-114: Power Specifications for the Catalyst 3550 Series Intelligent Ethernet Switches**

Description	Specification
Power consumption	190 W (maximum) 650 BTUs per hour (Catalyst 3550-12G and 3550-12T); 65 W (maximum), 222 BTUs per hour (Catalyst 3550-24); 86 W (maximum), 294 BTUs per hour (Catalyst 3550-48)
AC input voltage/frequency	100 to 127/200 to 240 VAC (auto-ranging), 50 to 60 Hz
DC Input Voltages	+12V @ 13A (Catalyst 3550-12G, 3550-12T, and 3550-48); +12V @ 8.3A (Catalyst 3550-24)

**Table 21-115: Physical and Environmental Specifications for the Catalyst 3550 Series Intelligent Ethernet Switches**

Description	Specification
Dimensions and (H x W x D)	2.63 x 15.9 x 17.5 in. (6.7 x 40.4 x 44.5 cm) (Catalyst 3550-12G and 3550-12T) 1.75 x 14.4 x 17.5 in. (4.45 x 36.6 x 44.5 cm) (Catalyst 3550-24) 1.75 x 16.3 x 17.5 in. (4.45 x 41.3 x 44.5 cm) (Catalyst 3550-48) 1.5 rack-unit (RU) high (Catalyst 3550-12G and 3550-12T) 1.0 rack-unit (RU) high (Catalyst 3550-48 and 3550-24)
Weight	16 lb (7.26 kg) (Catalyst 3550-12G and 3550-12T) 11 lb (5.0 kg) (Catalyst 3550-24) 13 lb (5.9 kg) (Catalyst 3550-48)
Operating temperature	32 to 113°F (0 to 45°C)
Storage temperature	-13 to 158°F (-25 to 70°C)
Operating relative humidity	10 to 85% (non-condensing)
Operating altitude)	Up to 10,000 ft (3,049 m)
Storage altitude	Up to 15,000 ft (4,573 m)
	Not intended for use on top of desktops or in open office environments

**Table 21-116: Regulatory Certifications and Approvals for the Catalyst 3550 Series Intelligent Ethernet Switches**

Description	Specification
Standards	IEEE 802.1x (planned future software support) IEEE 802.1w (planned future software support) IEEE 802.1s (planned future software support) IEEE 802.3x full duplex on 10BaseT, 100BaseTX, and 1000BaseT ports IEEE 802.1D Spanning-Tree Protocol IEEE 802.1p CoS Prioritization IEEE 802.1Q VLAN IEEE 802.3 10BaseT specification IEEE 802.3u 100BaseTX specification IEEE 802.3ab 1000BaseT specification IEEE 802.3z 1000BaseX specification 1000BaseX (GBIC) 1000BaseSX 1000BaseLX/LH 1000BaseZX RMON I and II standards SNMPv1 and SNMPv2c

Description	Specification
Safety Certifications	UL to UL 1950, Third Edition c-UL to CAN/CSA 22.2 No. 950-95, Third Edition TUV/GS to EN 60950 with Amendment A1-A4 and A11 CB to IEC 60950 with all country deviations NOM to NOM-019-SCFI CE Marking FCC Part 15 Class A EN 55022 Class A (CISPR 22 Class A) VCCI Class A AS/NZS 3548 Class A BSMI CE Marking

## Software

**Table 21-117: Software Management for Catalyst 3550**

Management	RFC 1213 IF MIB CISCO-CDP-MIB CISCO-IMAGE-MIB CISCO-FLASH-MIB OLD-CISCO-CHASSIS-MIB CISCO-PAGP-MIB CISCO-VTP-MIB CISCO-HSRP-MIB OLD-CISCO-TS-MIB BRIDGE-MIB (RFC1493) CISCO-VLAN-MEMBERSHIP-MIB CISCO-VLAN-IFINDEX-RELATIONSHIP-MIB CISCO-STACK-MIB (only a subset of the available MIB objects are implemented; not all objects are supported) RMON 1 MIB IGMP MIB      PIM MIB CISCO-STP-EXTENSIONS-MIB OSPF-MIB (RFC 1253) IPMROUTE-MIB CISCO-MEMORY-POOL-MIB CISCO-RTTMON-MIB CISCO-PROCESS-MIB OLD-CISCO-SYS-MIB CISCO-CONFIG-MAN-MIB SNMP MIB II
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## Ordering Information

### Product Part Numbers

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